

CLAIMS

1. A process for producing microcrystalline cellulose, comprising subjecting to a high shear treatment at elevated temperature, a reaction mixture comprising a cellulose material, an active oxygen compound and water for a time effective to depolymerize the cellulose material
2. The process of claim 1 wherein the cellulose material is depolymerized to an average degree of polymerization of 400 or less.
3. The process of claim 1 wherein the active oxygen compound is hydrogen peroxide and the reaction mixture is subjected to the high shear treatment in an extruder system including a barrel and a product outlet.
4. The process of claim 3 wherein the elevated temperature during the high shear treatment is at least about 40°C as measured on the barrel.
5. The process of claim 3 wherein the elevated temperature during the high shear treatment is at least about 40°C to 160°C as measured on the barrel.
6. The process of claim 3 wherein the elevated temperature during the high shear treatment is at least about 50°C to 110°C as measured on the barrel.

7. The process of claim 3 wherein the elevated temperature during the high shear treatment is at least about 90°C to 105°C as measured on the barrel.
8. The process of claim 3 wherein pressure at the product outlet is in the range of about 20 to 1500 psi.
9. The process of claim 3 wherein the hydrogen peroxide comprises an aqueous solution and is admixed with the cellulose material prior to introduction of the cellulose material to the extruder system.
10. The process of claim 3 wherein the hydrogen peroxide comprises an aqueous solution and is introduced into the extruder system after introduction of the cellulose material.
11. The process of claim 9 wherein the cellulose material comprises processed mill pulp, dissolving grade cellulose, purified cellulose, or dry cellulose in sheet or divided form.
12. The process of claim 10 wherein the cellulose material comprises processed mill pulp, dissolving grade cellulose, purified cellulose, or dry cellulose in sheet or divided form.
13. The process of claim 3 wherein the extrusion system comprises a twin-screw extruder.

14. The process of claim 3 wherein the extrusion system comprises a twin-screw extruder, the cellulose material comprises about 30% to about 50% by weight of the reaction mixture, and the hydrogen peroxide comprises about 0.1% to about 10% by weight of the reaction mixture, on a 100% active basis of hydrogen peroxide.
15. The process of claim 14 wherein the pH of the reaction mixture during extrusion is in the range of about 2 to 8.
16. The process of claim 14 wherein the extrusion is continuous and residence time is 15 minutes or less.
17. The process of claim 14 wherein the extrusion is continuous and residence time is 5 minutes or less.
18. The process of claim 3 wherein the reaction mixture includes an additive added before, during or after the high shear treatment.
19. The process of claim 18 wherein the additive is selected from a cellulose different from the cellulose material, a chemically modified cellulose, a seaweed extract, a natural gum, a protein, a synthetic hydrocolloid, starches, modified starches, dextrins, sugars, surfactants, emulsifiers, salts, and any mixtures of two or more thereof.

20. The process of claim 1 wherein the product is subjected to one or more finishing steps selected from washing, extraction, pH modification, attriting, filtering, screening, and drying to a powder form.
21. The process of claim 1 wherein the finishing steps include washing, attriting to colloidal particle size, and drying to powder form.
22. The microcrystalline cellulose produced by the process of claim 1.
23. The microcrystalline cellulose produced by the process of claim 3.
24. The microcrystalline cellulose produced by the process of claim 14.
25. The microcrystalline cellulose produced by the process of claim 19.
26. The microcrystalline cellulose produced by the process of claim 20.
27. The microcrystalline cellulose produced by the process of claim 21.
28. The process of claim 1 wherein, following the high shear treatment, the reaction mixture is held for a time effective to further depolymerize the cellulose material.
29. The process of claim 20 wherein the finishing step is attriting.

30. The process of claim 29 wherein the material is combined with an additive selected from a cellulose different from the cellulose material, a chemically modified cellulose, a seaweed extract, a natural gum, a protein, a synthetic hydrocolloid, starches, modified starches, dextrins, sugars, surfactants, emulsifiers, salts, and any mixtures of two or more thereof and the combination is attrited.
31. The process of claim 30 wherein the additive is carboxy methyl cellulose.